

3 a first multiply/accumulator (MAC) unit coupled to a first local memory, said  
4 first local memory comprising a first plurality of operands;  
5 a second MAC unit coupled to a second local memory, said second local  
6 memory comprising a second plurality of operands; and  
7 a shared operand unit coupled to said first MAC unit and said second MAC  
8 unit for providing a shared operand to said first MAC unit for computing a first result in association  
9 with said first plurality of operands and to said second MAC unit for computing a second result in  
10 association with said second plurality of operands; and  
11 wherein said first result and said second result are computed independently of  
12 each other.

REMARKS


Attached hereto is a marked-up version of the changes made to the Specification by the current Amendment. The attached page is captioned "VERSION WITH MARKINGS TO SHOW CHANGES MADE."

CONCLUSION

In view of the foregoing, Applicants believe all claims now pending in this Application are in condition for allowance. The issuance of a formal Notice of Allowance at an early date is respectfully requested.

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 650-326-2400.

Respectfully submitted,

  
Kim Kanzaki, Ph.D.  
Reg. No. 37,652

TOWNSEND and TOWNSEND and CREW LLP  
Two Embarcadero Center, 8<sup>th</sup> Floor  
San Francisco, California 94111-3834  
Tel: (415) 576-0200  
Fax: (415) 576-0300  
KK:amc  
PA 3140538 v1

**“VERSION WITH MARKINGS TO SHOW CHANGES MADE.”**

**IN THE CLAIMS:**

Claims 1 and 3 have been amended. Claims 2 and 4-9 have been cancelled. Claims 10-22 have added.

1                   1.       (Amended)   An integrated circuit for image frame rendering and DSP  
2 applications, the integrated circuit during operation operating with memory, the integrated circuit  
3 comprising:  
4                   an interface circuit configured to control access to said memory, the interface circuit  
5 coupled to said memory;  
6                   an embedded processor configured to control the integrated circuit, the embedded  
7 processor configured to control the interface circuit to receive information therefrom;  
8                   an array processor for performing arithmetic calculations, the array processor coupled  
9 to the interface circuit to receive information therefrom and directly connected to the embedded  
10 processor via an internal bus; and  
11                   wherein the array processor comprises:  
12                   a first multiply/accumulator (MAC) unit coupled to a first local memory, the  
13 first local memory comprising a first plurality of operands;  
14                   a second MAC unit coupled to a second local memory, the second local  
15 memory comprising a second plurality of operands; and  
16                   a first shared operand unit coupled to the first MAC unit and the second MAC  
17 unit for providing a first shared operand to the first MAC unit for computing a first result in  
18 association with the first plurality of operands and to the second MAC unit for computing a second  
19 result in association with the second plurality of operands; and  
20                   wherein the first result and the second result are computed independently of  
21 each other; and  
22                   wherein the array processor further comprises:  
23                   a second shared operand unit coupled to a third MAC unit and a forth MAC  
24 unit for providing a second shared operand to the third MAC unit and the forth MAC unit.

1                   2.       (Cancelled)

1           3.       (Amended)   The integrated circuit according to claim 1 wherein said  
2 interface circuit includes a wire bundle for providing wide access data transfers between the  
3 interface and the said array processor, and wherein said wire bundle comprises at least 256 wires.

1           4.       (Cancelled)

1           5.       (Cancelled)

1           6.       (Cancelled)

1           7.       (Cancelled)

1           8.       (Cancelled)

1           9.       (Cancelled)

1           --10.   (New) An integrated circuit using a memory, said integrated circuit  
2 comprising:  
3               an interface circuit configured to control access to said memory, said interface circuit  
4 coupled to said memory;  
5               a embedded processor configured to control said integrated circuit, said embedded  
6 processor receiving information from said interface circuit; and  
7               an array processor for performing mathematical calculations on data received from  
8 said interface circuit and connected to said embedded processor via an internal bus, said array  
9 processor comprising:  
10              a plurality of multiplier/accumulator circuits; and  
11              a plurality of shared operand circuits coupled to said plurality of  
12 multiplier/accumulator circuits for providing a shared operand to at least two of said plurality of  
13 multiplier/accumulator circuits.

1           11.     (New) The integrated circuit according to claim 10 wherein said interface  
2 circuit includes a wire bundle for providing wide access data transfers between the interface and said  
3 array processor, and wherein said wire bundle comprises at least 256 wires.

1           12.   (New) The integrated circuit according to claim 10 wherein separate  
2 instruction and data streams are maintained for said array processor.

1           13.   (New) The integrated circuit according to claim 10 wherein separate  
2 instruction and data streams are maintained for said embedded processor.

1           14.   (New) The integrated circuit according to claim 10 wherein said interface  
2 circuit is a Master Memory Interface Controller (MMIC) circuit.

1           15.   (New) The integrated circuit according to claim 10 wherein a  
2 multiplier/accumulator circuit of said plurality of multiplier/accumulator circuits comprises a  
3 computational unit that multiplies a first operand by a second operand to obtain a result and then  
4 adds or subtracts from said result a third operand, wherein said operands are either scalars or vectors.

1           16.   (New) The integrated circuit according to claim 10 further comprising  
2 a global external bus unit for providing an interface between said integrated circuit  
3 and said external environment, said global external bus unit coupled to said embedded  
4 microprocessor by a system bus and by a separate dedicated bus.

1           17.   (New) The integrated circuit according to claim 10 wherein said array  
2 processor performs a plurality of vector operations selected from a group consisting of addition of a  
3 plurality of vectors and multiplying a vector by a scalar.

1           18.   (New) The integrated circuit according to claim 10 wherein said array  
2 processor is configured to share a plurality of scalar elements among a plurality of vector  
3 components of a vector, wherein a first scalar element of said plurality of scalar elements  
4 mathematically operating on a first vector component of said plurality of vector components and a  
5 second scalar element of said plurality of scalar elements mathematically operating on a second  
6 vector component of said plurality of vector components are calculated in parallel.

1           19.   (New) The integrated circuit according to claim 10 wherein said array  
2 processor uses a simplified IEEE floating point notation which excludes said IEEE floating point  
3 exceptions, comprising underflow, overflow, divide by zero, inexact, and invalid.

1                   20.   (New) The array processor of claim 10 further comprising:  
2                   a front end unit for determining a fixed point result by performing a fixed point  
3 addition or subtraction on a plurality of operands;  
4                   a floating point conversion unit for converting said fixed point result to a first floating  
5 point result; and  
6                   a multiplier and accumulator unit for determining a second floating point result by  
7 performing a floating point multiplication and then accumulation using at least said first floating  
8 point result.

1                   21.   (New) An integrated circuit for image frame rendering applications, said  
2 integrated circuit during operation operating with memory, said integrated circuit comprising:  
3                   an interface circuit configured to control access to said memory, said interface circuit  
4 coupled to said memory;  
5                   a processor embedded in said integrated circuit, said processor receiving information  
6 from said interface circuit; and  
7                   an array processor coupled to said interface circuit and to said processor via an  
8 internal bus;  
9                   wherein the array processor is configured to:  
10                  determine a fixed point result by performing a fixed point addition or subtraction on a  
11 plurality of fixed point operands;  
12                  convert the fixed point result to a first floating point result; and  
13                  determine a second floating point result by performing a floating point multiplication  
14 and then accumulation using the first floating point result and at least one floating point operand.

1                   22.   (New) The integrated circuit according to claim 21 wherein said array  
2 processor comprises:  
3                   a first multiply/accumulator (MAC) unit coupled to a first local memory, said  
4 first local memory comprising a first plurality of operands;  
5                   a second MAC unit coupled to a second local memory, said second local  
6 memory comprising a second plurality of operands; and  
7                   a shared operand unit coupled to said first MAC unit and said second MAC  
8 unit for providing a shared operand to said first MAC unit for computing a first result in association

9 with said first plurality of operands and to said second MAC unit for computing a second result in  
10 association with said second plurality of operands; and

11 wherein said first result and said second result are computed independently of  
12 each other.--